

overcoating layer and at least one hydrophilic group spaced apart from the linking group by a hydrophobic region sufficient to prevent electron charge transfer across the hydrophobic region; and

a compound associated with the overcoating layer.

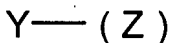
50. The composition of claim 49, wherein the compound is associated with the overcoating layer via a ligand of the outer layer.

51. The composition of claim 50, wherein the compound is associated with the hydrophilic group of the ligand.

52. The composition of claim 49, wherein the ligands of the outer layer solubilize the composition in water.

53. The composition of claim 49, wherein ligands of the outer layer comprise a compound of the formula,  $H_2X((CH_2)_nCO_2H)_y$  and salts thereof, where X is S, N, P or O=P;  $n \geq 6$ ; and z and y are selected to satisfy the valence requirements of X.

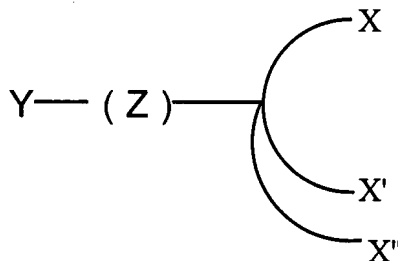
54. The composition of claim 49, wherein ligands of the outer layer comprise a compound of the formula



X'

where Y is a hydrophilic moiety; Z is a hydrophobic region having a backbone of at least six atoms; and X and X' are the same or different and are selected from the group consisting of S, N, P and O=P.

50. 55. The composition of claim 49, wherein ligands of the outer layer comprise a compound of the formula



where Y is a hydrophilic moiety; Z is a hydrophobic region having a backbone of at least six atoms; and X, X', and X'', each are the same or different and are selected from the group consisting of S, N, P and O=P.

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56. A water-soluble composition comprising:  
a water-soluble semiconductor nanocrystal having a selected band gap energy; and  
a compound associated with the semiconductor nanocrystal, wherein the water-soluble semiconductor nanocrystal exhibits photoluminescence having a quantum yield of greater than 10% in water.

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57. The composition of claim 56, wherein the water-soluble semiconductor nanocrystal further includes a ligand of the formula,  $H_zX((CH_2)_nCO_2H)_y$  and salts thereof, associated with the water-soluble semiconductor nanocrystal, wherein X is S, N, P or O=P;  $n \geq 6$ ; and z and y are selected to satisfy the valence requirements of X.

58. A water-soluble composition comprising:  
a water-soluble semiconductor nanocrystal having a selected band gap energy; and  
a compound associated with the semiconductor nanocrystal, wherein the water-soluble semiconductor nanocrystal exhibits photoluminescence having a quantum yield between about 10-30% in water.

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59. A composition comprising:

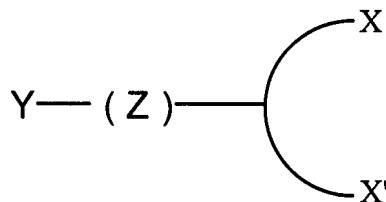
a semiconductor nanocrystal having a selected band gap energy, wherein the semiconductor nanocrystal includes a ligand of the formula,  $H_zX((CH_2)_nCO_2H)_y$  or a salt thereof, where X is S, N, P or O=P;  $n \geq 6$ ; and z and y are selected to satisfy the valence requirements of X; and

a compound associated with the semiconductor nanocrystal.

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60. A composition comprising:

a semiconductor nanocrystal having a selected band gap energy, wherein the semiconductor nanocrystal includes a ligand of the formula

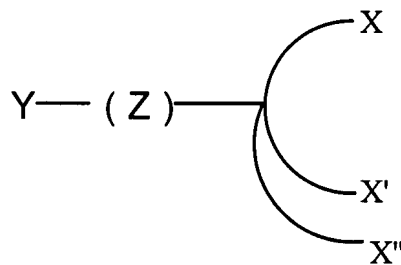


where Y is a hydrophilic moiety; Z is a hydrophobic region having a backbone of at least six atoms; and X and X' are the same or different and are selected from the group consisting of S, N, P and O=P.

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61. A composition comprising:

a semiconductor nanocrystal having a selected band gap energy, wherein the semiconductor nanocrystal includes a ligand of the formula



where Y is a hydrophilic moiety; Z is a hydrophobic region having a backbone of at least six atoms; and X, X', and X'', each are the same or different and are selected from the group consisting of S, N, P and O=P.--